

REMARKS

I. Introduction

In response to the Office Action dated December 14, 2004, claims 1, 6, 8-11, 14, and 19 have been amended. Claims 1-20 remain in the application. Re-examination and re-consideration of the application, as amended, are respectfully requested.

II. Allowable Subject Matter

In paragraph 13, the Office Action indicates that the subject matter of claims 7-8 and 17-18 would be allowable if written in independent form including all of the limitations of the base claim and any intervening claims. The Applicants acknowledge the Office Action's indication of allowable subject matter in claims 7-18.

III. Claim Amendments

Applicants' attorney has made amendments to the claims as indicated above. These amendments were made solely for the purpose of clarifying the language of the claims, and were not required for purposes of patentability.

IV. Office Action Objections

In paragraph 1, the Office Action objects to the disclosure for a typographical error on page 4, line 8, where a word was repeated.

The Applicants thank the Examiner for the thorough examination and have amended the specification in response to this objection.

In paragraphs 2-5, the Office Action objects to claims 6, 8, 9, and 14 for various informalities.

The Applicants have amended the claims in response to these objections.

In paragraph 6, the Office Action objects to claim 16 because of an informality regarding "means for electrically connecting the capacitive element."

The Applicants respectfully traverse the objection. The recitation of "a means for electrically connecting the capacitive element" is proper, since this is the first time this element is introduced.

Changing the recitation to "the means for electrically connecting the capacitive element" would leave the recitation with improper antecedent basis. The Applicants respectfully request that the objection to claim 16 be withdrawn.

V. Non Art Rejection

In paragraphs 7-11, the Office Action rejects claim 9, 10, and 19 under 35 U.S.C. §112, second paragraph.

The Applicants have amended the claims in response to these rejections.

VI. Office Action Prior Art Rejections

In paragraphs 11-12, the Office Action rejected claims 1-6, 9-16, and 19-20 under 35 U.S.C. § 102(e) as unpatentable over Kanamaluru, USPN 6,529,166. Applicants respectfully traverse these rejections in light of the amendments above and the arguments presented herein.

A. The Kanamaluru Reference

U.S. Patent No. 6,529,166, issued March 4, 2003 to Kanamaluru discloses an ultra-wideband multi-beam adaptive antenna. An ultra-wideband, multi-beam adaptive antenna includes a phased array system having an ultra-wideband antenna. The antenna further includes at least two sub-arrays of antenna elements for receiving radio frequency (RF) signals located in a respective at least two sub-bands of a desired wide frequency band. The sub-arrays are interspersed to provide a single wideband antenna, which is coupled with a phased array system having multiple beamforming networks.

The high impedance surface structure 21 can be used to reduce the propagation of surface-wave modes that can cause coupling between antenna elements. FIG. 2A depicts a top view and FIG. 2B depicts a cross-sectional view of the high-Z surface structure 212. See Col. 3, lines 50-55.

The high-Z surface structure 212 reduces mutual coupling between elements of a sub-array and/or between elements of different sub-arrays. See Col. 4, lines 20-23.

B. The Subject Invention

A circularly polarized antenna system having improved axial ratio is disclosed. An antenna system in accordance with the present invention comprises a circularly-polarized antenna having a first area, a high-impedance buffer surface, disposed between the circularly polarized antenna and a ground plane, wherein a surface area of the high-impedance buffer surface area is greater than the first area such that a border area of the high-impedance buffer surface surrounds the circularly-polarized antenna; and wherein a width of the border area of the high-impedance buffer surface is selected to achieve an H-plane radiation pattern substantially identical to an E-plane radiation pattern over a desired scan angle.

C. Differences Between the Subject Invention and the Cited References

The cited reference does not teach or suggest the limitations of the present invention. Specifically, the cited reference does not teach or suggest at least the limitation of wherein a surface area of the high-impedance buffer surface area is greater than the first area such that a border area of the high-impedance buffer surface surrounds the circularly-polarized antenna wherein a width of the border area of the high-impedance buffer is selected to achieve an H-plane radiation pattern substantially identical to an E-plane radiation pattern over a desired scan angle as recited in the claims of the present invention.

As shown in at least FIGs. 1B and 1C of the present invention, and as described on at least pages 3-4 of the application as filed, the present invention relates to selection of the width x of a border area surrounding and extending beyond the circularly polarized antenna, wherein such selection achieves an H-plane radiation pattern substantially identical to an E-plan radiation pattern over a desired scan angle.

The cited reference does not discuss the high-impedance surface structure 212 in such a fashion. Further, other than discussing the reduction of mutual coupling of the elements of the sub-array and/or reduction of coupling between elements of different sub-arrays within an antenna, the cited reference does not discuss the high-impedance surface structure 212 at all.

Should the Office Action rely on inherency to teach the limitations described herein, inherency "may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Continental Can Co. v. Monsanto Co.*,

948 F.2d 1264, 1269 (Fed. Cir. 1991). Instead, to establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *Continental Can Co.*, 948 F.2d at 1268.

In finding anticipation by inherency, the Office Action ignored the foregoing critical principles. The Office Action has not shown that a discussion of scan angles, radiation patterns in either the E-plane or the H-plane, or any teaching of how the radiation pattern is affected by the high-Z surface structure 212 is necessarily present in the reference of record. Further, the cited reference never discusses the width of the border area of the high-impedance surface structure 212, and, as such, cannot inherently teach at least the limitations of independent claims 1 and 11.

The various elements of the Applicants' claimed invention together provide operational advantages over the systems disclosed in Kanamaluru. In addition, Applicants' invention solves problems not recognized by Kanamaluru. For example, the present invention allows for selection of substantially equal E-plane and H-plane radiation patterns for a given scan angle, and thus antennas made in accordance with the present invention can be tailored to specific applications to be more efficient.

VII. Dependent Claims

Dependent claims 2-10 and 12-20 incorporate the limitations of their related independent claims, and are therefore patentable on this basis. In addition, these claims recite novel elements even more remote from the cited references. Accordingly, the Applicants respectfully request that these claims be allowed as well.

VIII. Conclusion


In view of the above, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited. Should the Examiner believe minor matters still remain that can be resolved in a telephone interview, the Examiner is urged to call Applicants' undersigned attorney.

Respectfully submitted,

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